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Lecanora wrightiana and *Rhizocarpon inimicum*, rare lichens new to Turkey and the Middle East

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Abstract — During a recent excursion in Iğdır region (Turkey), we sampled lichens from two localities, among which *Lecanora wrightiana* and *Rhizocarpon inimicum* were determined as new to Turkey and the Middle East. Geographic distribution, substrate, chemistry, and comparisons with morphologically similar taxa are presented.

Key words — *Ascomycetes*, biodiversity, parasitic

Introduction

Compared to other countries, not many lichen studies have been conducted in Turkey, so the lichen flora of Turkey remains poorly known. Recently, many lichen taxa have been recorded for Turkey (Yazici et al. 2010a,b,c, Candan & Halici 2009, Candan et al. 2010, Kinalioğlu & Aptroot 2010, Kinalioğlu 2010a,b), but more studies are needed to form a complete lichen flora. No lichenized fungi have previously been reported for Iğdır region.

To date, 27 *Rhizocarpon* species and 95 *Lecanora* taxa have been reported from Turkey. At least 18 parasitic *Rhizocarpon* species are known from Europe (Poelt & Hafellner 1983, Poelt & Vězda 1984, Timdal 1986), but only one parasitic species (*Rhizocarpon epispilum* on *Pertusaria rupicola*) has been found from Turkey (Breuss & John 2004).

Material & methods

Iğdır, one of the poorest forested areas in Turkey, is dominated by steppe. Rich grassy plants cover the surface of the province. **Mo**untain Zordağ (Iğdır: Center) is a well-lit, very high, windswept, open treeless area with gently sloped terrain with streams, grass and rocks. *Prunus*, *Pyrus,* and *Populus* trees are dominant in Üçkaya village (Iğdır: Tuzluca) with *Salix* and *Elaeagnus* occasionally present (Baytop & Denizci 1963). The

climate is characterized by hot and dry summers with moderate precipitation, and cold, snowy winters with high precipitation. Mean annual temperature is 11.6°C. The mean annual rainfall is about 257.6 mm. Mean annual humidity is 63%. (Akman 1999).

The lichen specimens were collected from Iğdır region on 13–14 June 2010. Air-dried samples were examined with Nikon SMZ1500 stereomicroscope and a Nikon Eclipse 80i light microscope. Identifications were determined by consulting keys (Guderley & Lumbsch 1999, Miyawaki 1988, Poelt 1990, Poelt & Vězda 1984, Upreti 1997). Vouchers are stored in the herbarium of the Biology Department, Karadeniz Technical University, Trabzon, Turkey (KTUB).

Species recorded

Lecanora wrightiana Zahlbr., Catalogus Lichenum Univeralis 5: 600. 1928 Fig 1

= *Lecanora japonica* Tuck., Sert. Lich. Trop. Labuan Singapore: 35. 1891, nom. illegit., non Müll. Arg. 1879.

Thallus corticolous, to 1 cm diam., thin, continuous or rimose–areolate to verruculose, slightly yellow-grey, ±cream-white, to slightly greenish–grey, epruinose. Soredia absent. Apothecia sessile to slightly constricted at the base, circular to irregular, 0.2–0.7 mm diam., disc dark red-brown, bright red–brown when wet, epruinose; margin smooth, concolorous with thallus, mostly cream-white, entire. Cortex hyaline, gelatinous, with small crystals. Amphithecium *campestris*-type with small crystals. Parathecium hyaline, without crystals, 15 µm thick. Epihymenium *glabrata*-type, without crystals, red-brown, egranulose. Paraphyses apically ±reticulate and slightly thickened. Asci cylindric-clavate, 12-spored. Ascospores ellipsoid, 13–15 × 7–8 µm. Thallus and margin of apothecium contains atranorin and chloroatranorin. K+ yellow, C–, KC–, P ± yellow.

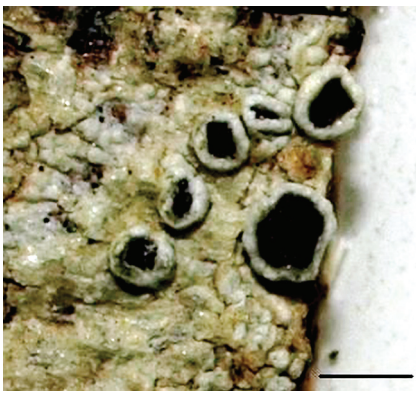
Specimen examined: **TURKEY. Iğdır:** Tuzluca, Üçkaya village, 39°58'13.11"N, 43°39'44.08"E, on *Populus* sp., 1456m, 14.06.2010, KTUB–2018.

Remarks— By its *campestris*-type amphithecium, *L. wrightiana* is similar to *L. elapheia,* which, however, contains eight spores per ascus and produces triterpenoids.

Lecanora wrightiana occurs mainly on bark and more rarely on rocks in mountain regions. Previously known from Japan and India, it seems to be especially common in Japan (Miyawaki 1988, Guderley & Lumbsch 1999). New to Turkey and the Middle East.

Rhizocarpon inimicum Poelt & Vězda, Herzogia 6(3–4): 471. 1984. Fig 2

Thallus to 3.5 mm in diam., develops its ascomata, disappears at maturity, areolate and parasitic on *Lecanora rupicola*, black-grey, flat at first, soon with massive curved areolae; areolae 0.5–1.5 mm diam., plane at first, later convex; apothecia in small groups, 0.2–0.7(–1) mm; discs dark-brown; proper margin



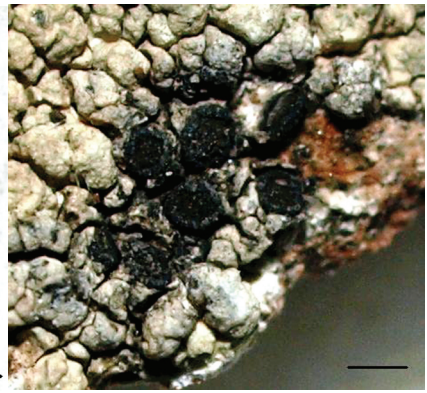


Fig. 1 (left). *Lecanora wrightiana.* Fig. 2 (right). *Rhizocarpon inimicum.* Scale*:* 1mm.

black, slightly ± crenulate, curly-raised, ±pruinose, areolate initially, superficial, sessile, immarginate, later moderately marginate in rough, soon concave; hypothecium irregularly, brown; hymenium 120–150 µm high; epihymenium black-brown; hypothecium brown; amphithecium discrete, black-brown, cellular. Asci clavate, ascospores 19–26 × 10–14 µm, ellipsoid, wavering in the middle or constricted, grey-brown to black-brown, 1-septate at first, vertical to crosswise septa later, 4-celled at maturity, photobiont trebouxioid, hypothallus indistinct, pycnidia absent. Thallus K–, C–, KC–, P–. Medulla I ± violet.

Specimens examined: **TURKEY. Iğdır:** Center, Zordağ, 39°45'49.05"N, 43°53'20.13"E, on *Lecanora rupicola*, 2400m, 13.06.2010, KTUB–2020.

Remarks—*Rhizocarpon* species with dark brown or grey-green ascospores placed in subg. *Phaeothallus —R. advenulum, R. epispilum, R. inimicum, R. santessonii* and *R. schedomyces*— have 1-septate to submuriform spores (Poelt & Hafellner 1983, Poelt & Vězda 1984), but *R. santessonii* has the smallest ones (Poelt & Vězda 1981). *Rhizocarpon epispilum* does not have an amyloid medulla or vegetative hyphae (Timdal 1986) and produces 2-septate spores, while *R. inimicum* has 1-septate spores with vertical to crosswise septa. *Rhizocarpon advenulum*, *R. epispilum,* and *R. schedomyces* grow on *Pertusaria* spp.; *R. santessonii* grows on *Tremolecia atrata;* and *R. inimicum* grows on *Lecanora rupicola*.

Rhizocarpon inimicum grows parasitically on *Lecanora rupicola* (Poelt and Vězda 1984). Not many parasitic *Rhizocarpon* species have been reported in Turkey, probably because little lichenological research has been performed. If studies on the lichen flora of Turkey are continued, we hope that the number of recorded *Rhizocarpon* species can be increased. Previously known from Spain and Portugal. New to Turkey and Asia.

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